INTEGRATED CIRCUIT

AWM 1338

48 ELEMENT SELF SCANNED PHOTO-DIODE ARRAY

The AWM1338 is a monolithic MSI linear array of photo-diodes, designed to produce a series of voltage pulses proportional to the integrated incident light intensity on each diode in succession.

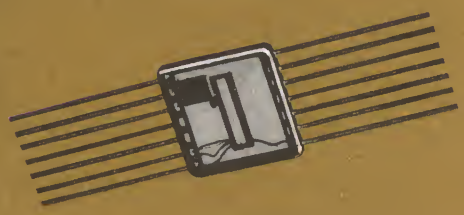
This integrated circuit contains a linear array of 48 photo-diodes having 100 μM between centers and each diode is designed to operate in the photo-flux integrating mode. A 50 bit two phase dynamic P-MOS shift register is included to interrogate each photo-diode in turn.

On the initial pass of a single data bit through the register, the diodes are charged and any subsequent light falling on the diodes will discharge them at a rate directly proportional to the instantaneous incident light. A series of output pulses is now produced, each of which is proportional to the amount of energy required to recharge the diodes, during the pass of the data bit in the shift register.

A differential output is provided to minimise multiplexing noise and the high output impedance of the MOS transistor is transformed by a separate bipolar differential amplifier in the same package.

The output appears as a series of voltage pulses, each pulse corresponding to one diode; the amplitude of each pulse being proportional to the total flux that had fallen on the corresponding diode between successive passes of the data bit.

The high uniformity of the output, – better than 10% – makes the array suitable for such applications as facsimile detectors, while the close spacing suits it for position detectors.



14 lead flat pack.
Details on page 4.

APPLICATIONS

- Position detectors.
- Facsimile detectors.
- High speed optical readers.
- Industrial process control.
- Slow scan image converters.

FEATURES

- High speed applications.
- Linear array of photo diode.
- Can be used with A to D converters
- Wide dynamic range.
- Externally variable sensitivity.

GENERAL CHARACTERISTICS

Package	14 lead
Maximum Storage Temperature	125°C
Operating Temperature Range	0 – 70°C
Supply Voltage Range	–10 to –20 volts
Operating Frequency Range	10^3 to $5x10^5$ H_z
Dynamic Range at 10% uniformity	30 : 1 minimum
Integrate Time	0.01 to 50 mS

Designed and Manufactured in Australia by –
AMALGAMATED WIRELESS (AUSTRALASIA) LTD.
348 Victoria Road Rydalmere N.S.W. Australia.
Postal Address – A.W.V. Private Mail Bag Ermington, 2115.
Telegrams "Valves" Ermington, Telephone 638 0411.

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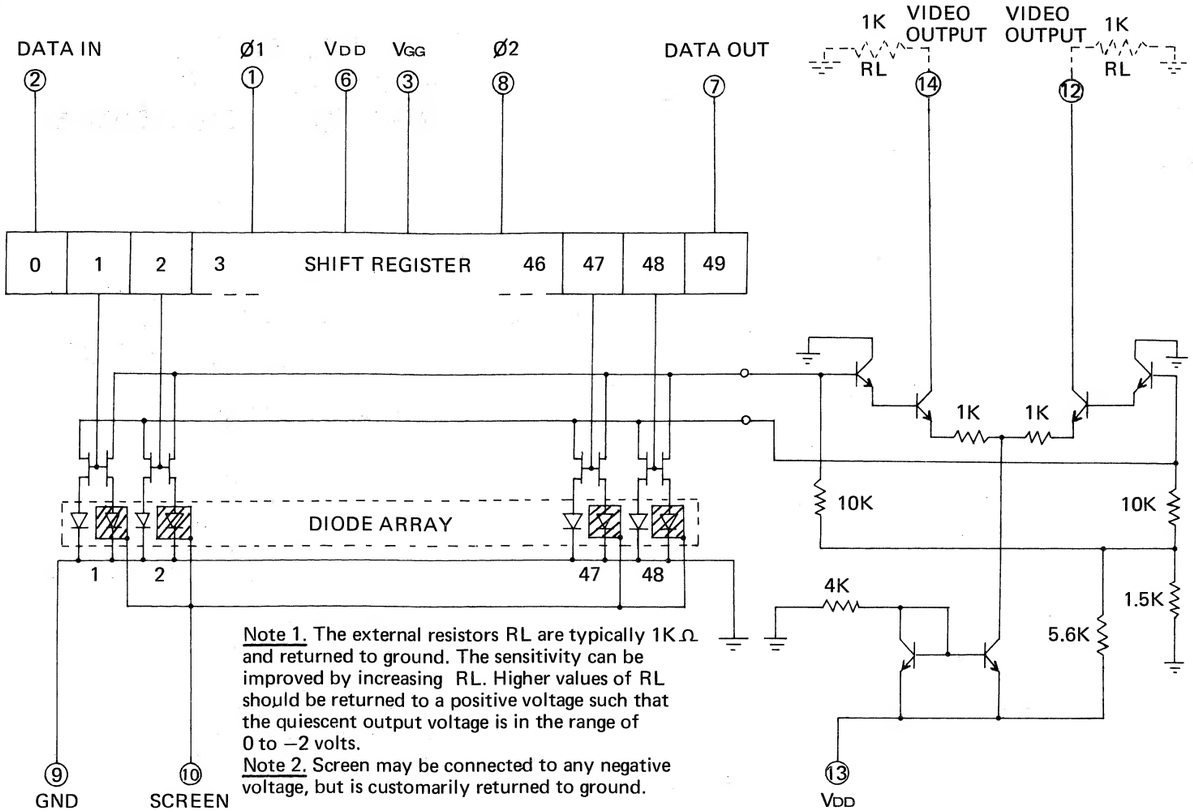
Supersedes Issue ———



Note 1. The external resistors RL are typically 1KΩ and returned to ground. The sensitivity can be improved by increasing RL. Higher values of RL should be returned to a positive voltage such that the quiescent output voltage is in the range of 0 to −2 volts.

Note 2. Screen may be connected to any negative voltage, but is customarily returned to ground.

Figure 1. AWM 1338 Functional schematic diagram.

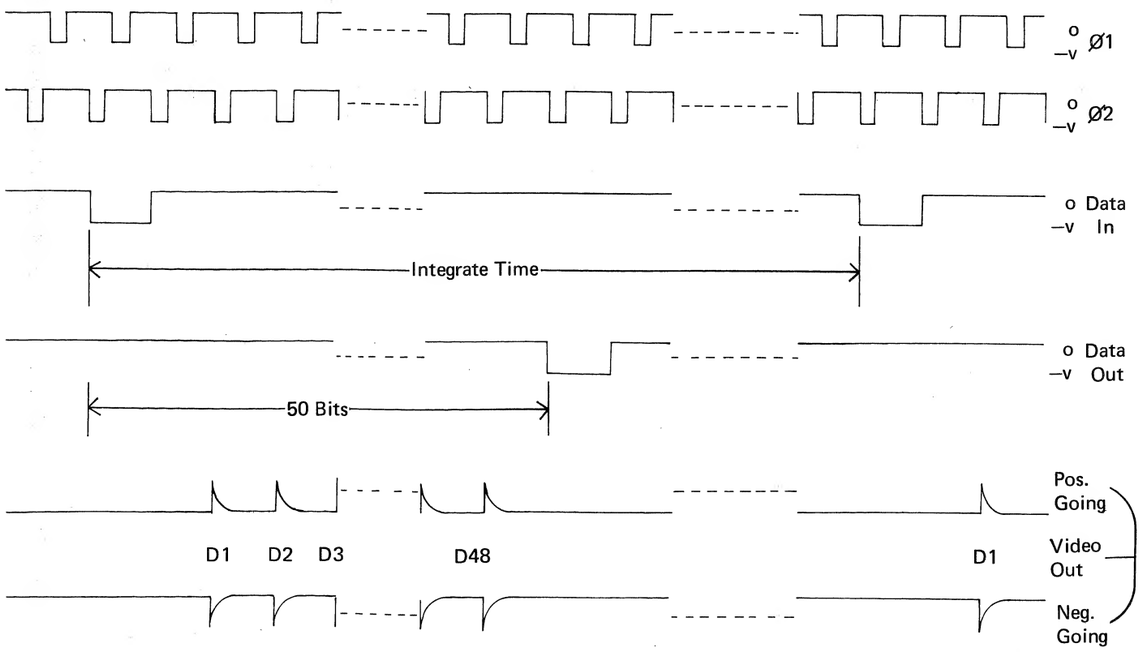


Figure 2. The timing of the output waveforms and their relation to the clock signals.

STATIC AND DYNAMIC ELECTRICAL CHARACTERISTICS

PIN	FUNCTION			Limits Min.	Typ.	Max.	Units
1	Clock in Ø1	Input voltage		−10	−15	−20	Volts
		Clock frequency		10^3		$5x10^5$	Hz
2	Data in	High state		−5	−15		Volts
		Low state			−1	−3	Volts
3	Supply	Voltage	VGG	−15	−18	−20	Volts
		Current	IGG			100	μA
4	No connection						
5	No connection						
6	Supply	Voltage	VDD	−10	−15	−20	Volts
		Current	IDD		15·		mA
7	Data out	High state		−10	−15		Volts
		Low state			−0.5	-1_1	Volt
8	Clock in Ø2	Input voltage		−10	−15·	−20	Volts
		Clock frequency		10^3		$5x10^5$	Hz
9	Ground and case						
10	Screen	Normally grounded or to a negative potential.					
11	No connection	Do not use for any purpose					
12	Negative output	Quiescent conditions: Set Vout between + and − 2 volts by adjusting value of RL	Ic Vout	−2	1.6	+2	mA Volts
13	Supply	Normally connected to VDD, Pin 6.	VDD		−15		Volts
14	Positive output	See pin 12, but with reversed polarities					

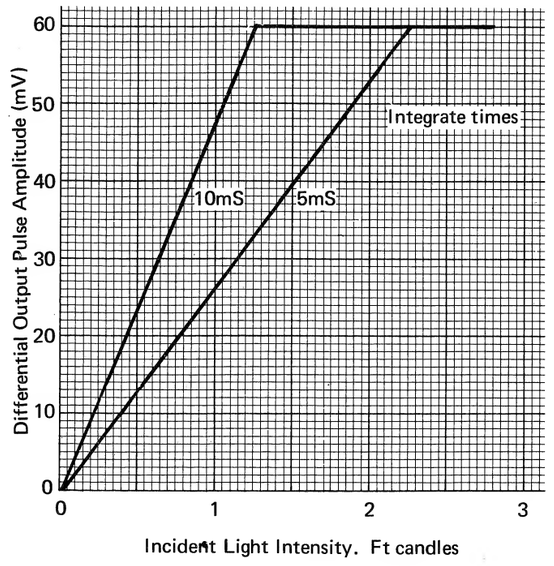


Figure 3. Output pulse amplitude at low incident light intensities

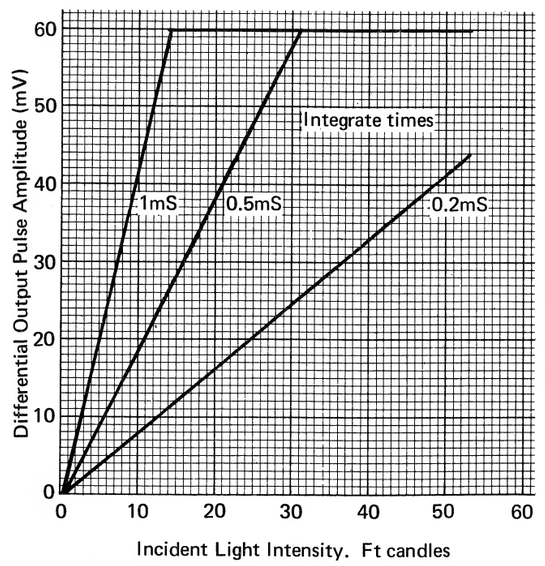


Figure 4. Output pulse amplitude at high incident light intensities

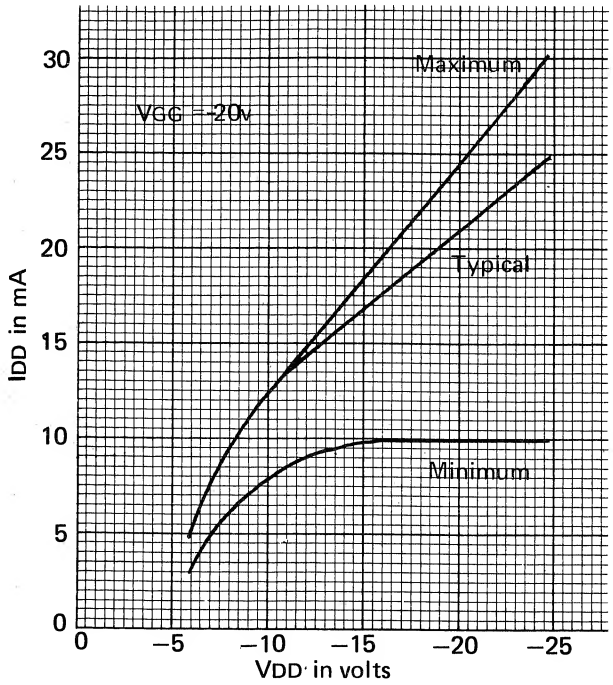


Figure 5 Variation in supply current with constant VGG.

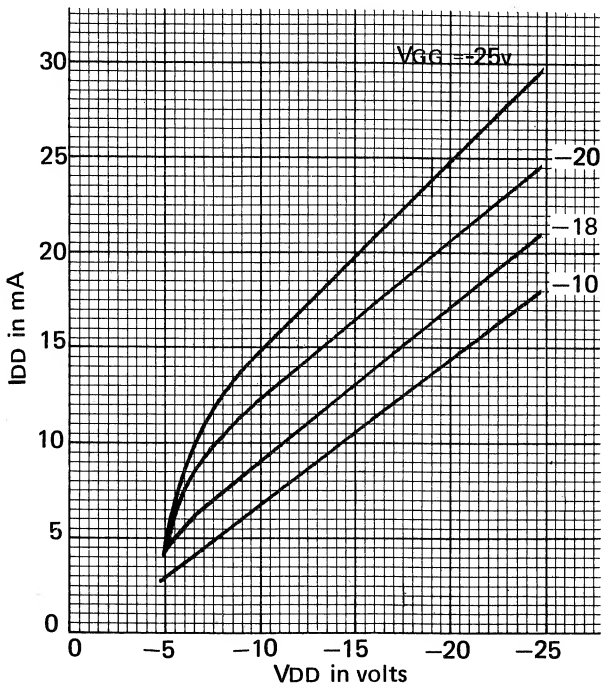


Figure 6 Typical supply current as a function of supply volts with VGG as a parameter.

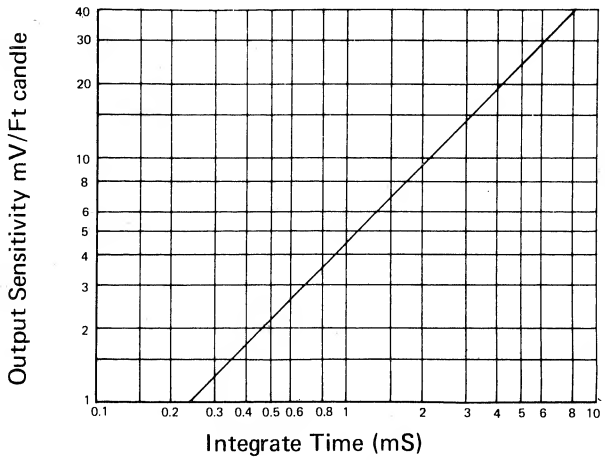
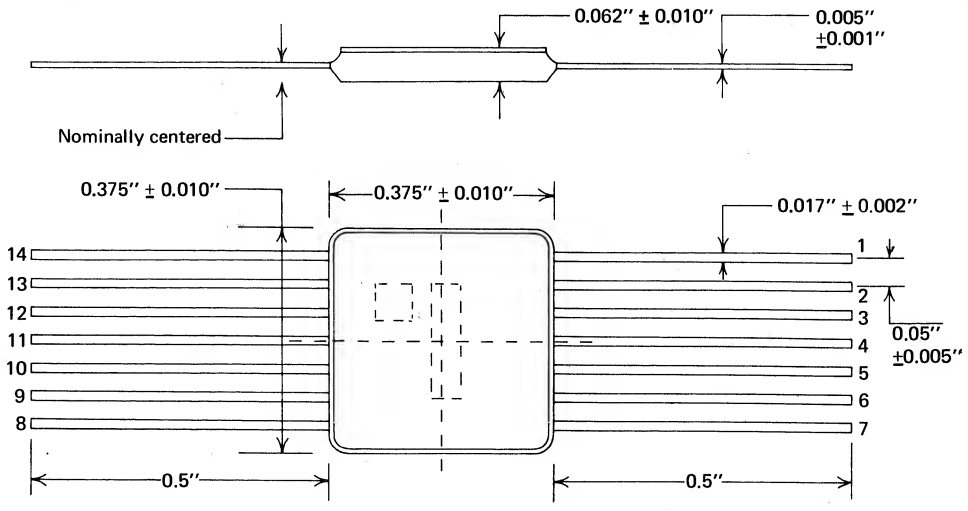


Figure 7.

Sensitivity as a function of integrate time

PIN CONNECTIONS AND DIMENSIONAL OUTLINE

Pin No.
1. Clock Ø1
2. Data in
3. VGG supply
4. No connection
5. No connection
6. VDD supply
7. Data out
8. Clock Ø2
9. Ground and case
10. Screen
11. Not to be used
12. Output (Negative)
13. VDD supply
14. Output (Positive)



Centerlines of diode array are within ±0.025 inch of package centerlines.
Pin numbers when viewed from window side.